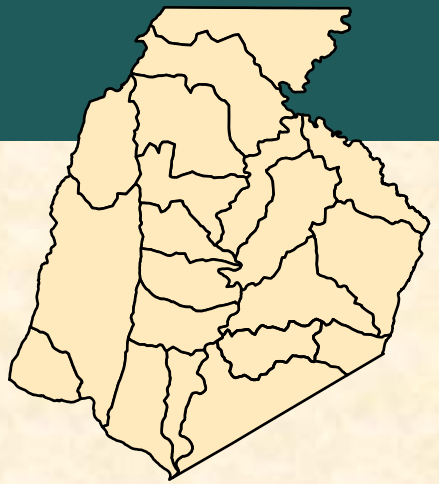
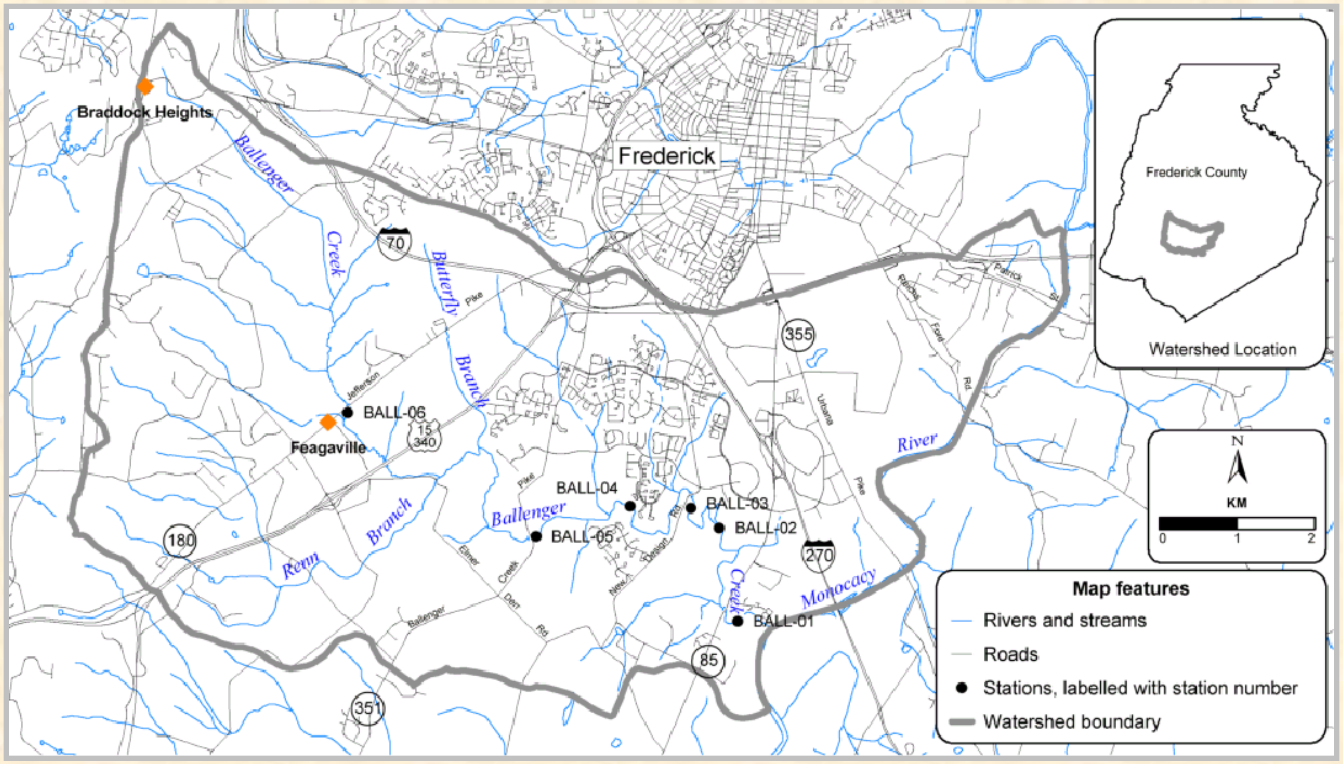
Watershed Management in Frederick County





Watershed Management Section

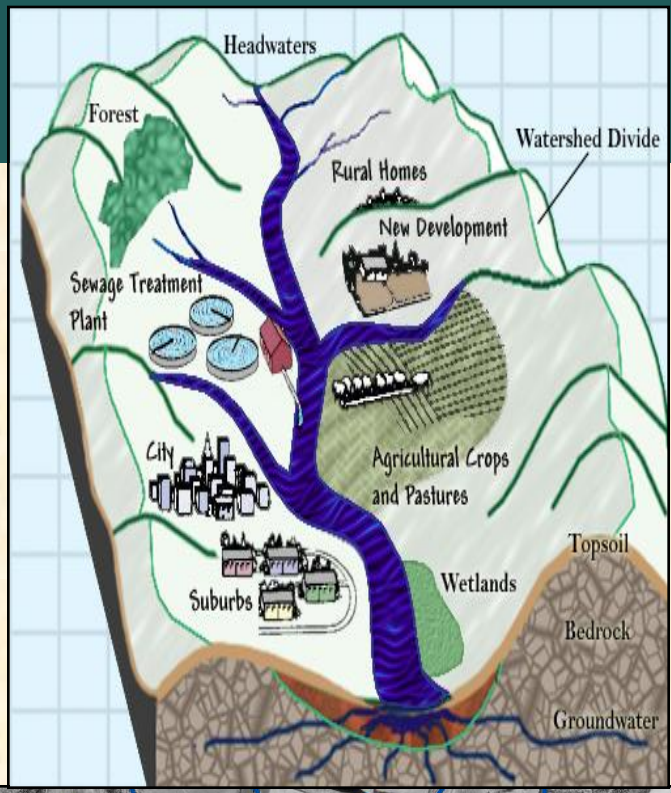
Department of Program Development and Management

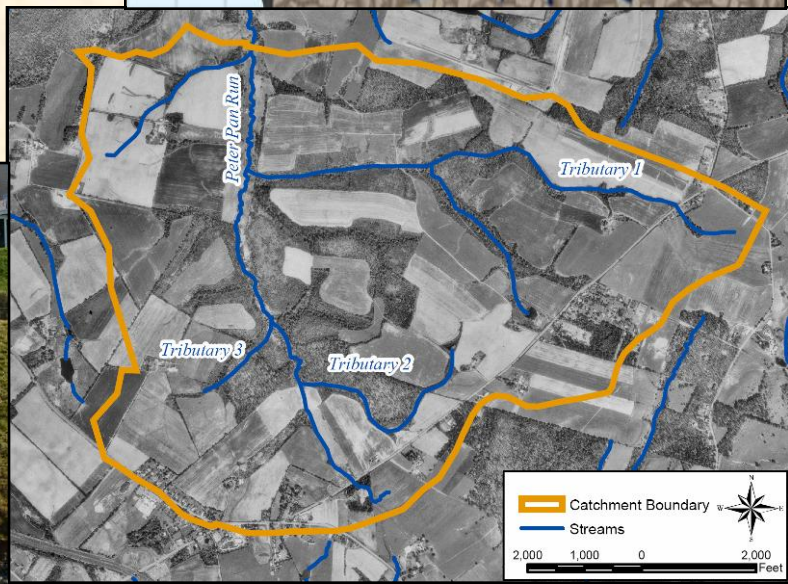
Division of Public Works

October 21, 2009

Watershed Management Overview

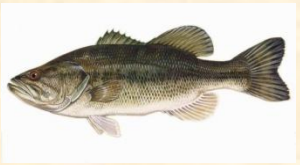
- Comply with NPDES permit
  - Identify resources and impairments
  - Map in GIS (18 different data layers)
  - Monitor water bodies
  - Conduct studies and management programs
  - Outreach and education
  - Identify solutions to stream impairments in urban areas
  - Correct problems found in urban streams

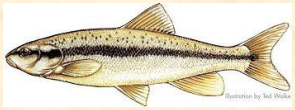




Resource Identification: Fish Example

- **County and State stream surveys have found >48 fish species (4th highest in MD counties).**
- **Small streams serve as nursery for larger gamefish; Frederick County streams support…**
  - **Largemouth and smallmouth bass;**
  - **Brook trout (MD's only native trout) – once widespread, now only at about 4% of sites.**
  - **Brown trout;**
  - **American eel;**
  - **Bluegill and 5 other sunfish types;**
  - **4 catfish relatives;**
  - **20 minnow species (fish food!)**
- **Brook trout populations are expected to go extinct this century due to climate change.**

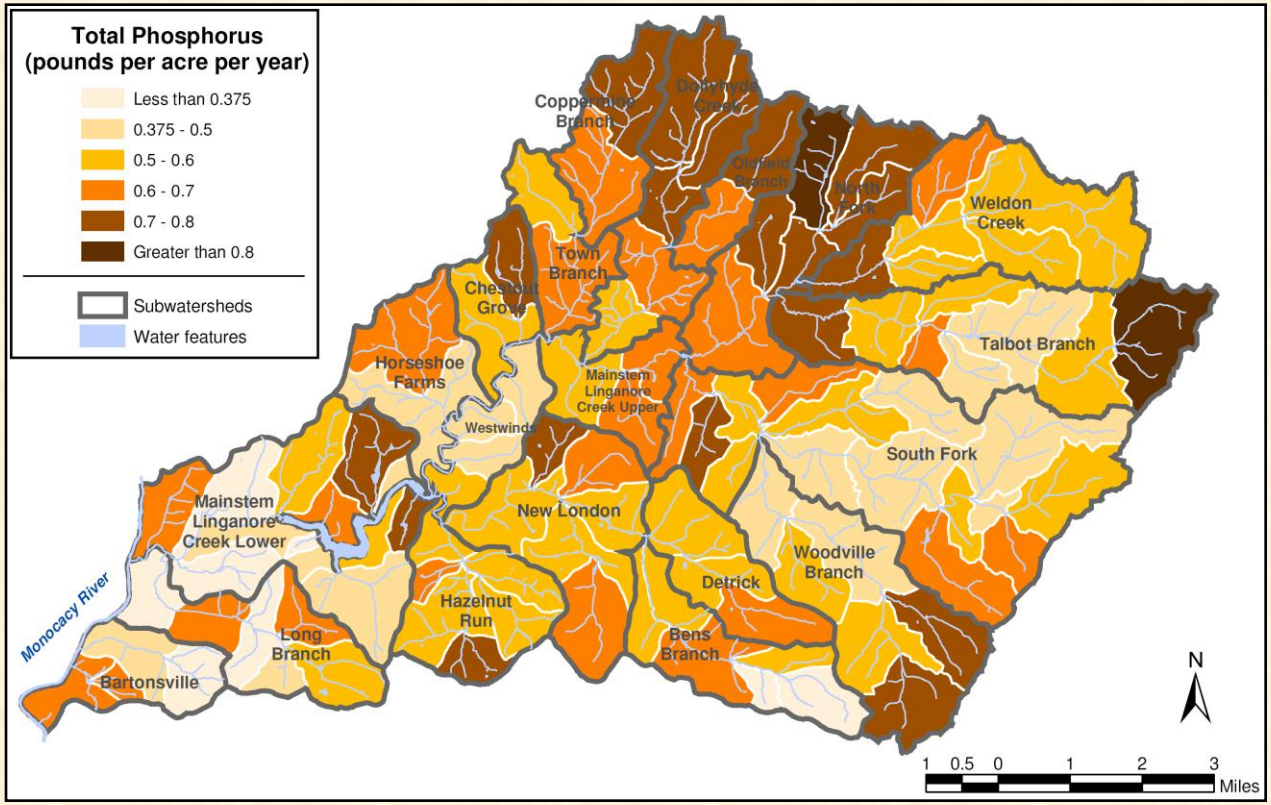




[Source: PSU CDGRS]

GIS Mapping: Pollutant Loading Example

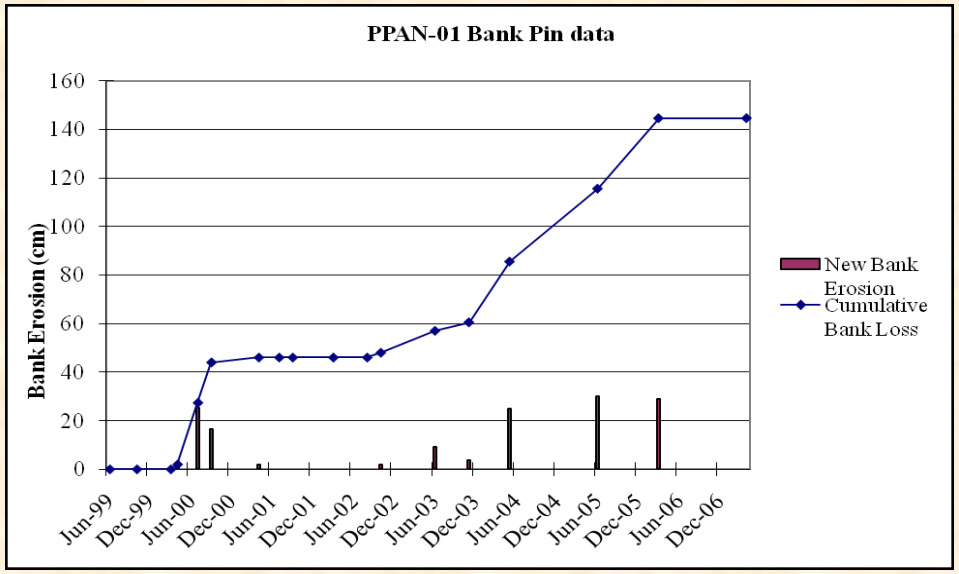
- Smaller catchment units mapped within larger watersheds
- Pollutant loads calculated by smaller catchments within watersheds
- Higher loading areas targeted for outreach.
- Stream impairments from nutrients and sediment are on the rise.



Linganore Watershed has regulatory limits on Phosphorus and Sediment known as Total Maximum Daily Loads

Water Monitoring: Urbana PUD Example

- County monitoring of Peter Pan Run in Urbana PUD during development (better than average controls)
- Increased storm flows, decreased baseflows
- Increase in "urban pollutants" including zinc, cadmium, copper, lead, total petroleum hydrocarbons, phenols, oil and grease, sediment, phosphorus, fecal coliform.
- 260,000 - 1,750,000 lbs sediment lost from Peter Pan Run every year since 1999.
- Streams are becoming more sediment-embedded, which negatively affects habitat.
- Most water bodies now have regulatory limits set on sediment. We are not meeting the limits.



Cumulative erosion

NPDES Compliance Activities: Management Programs

- **Triennial preventative maintenance inspections of all SWMF**
- **Annually, field screen at least 150 outfalls (DPDR);**
- **Maintain illicit discharge detection and elimination program and respond to illegal dumping and spills;**
- **Maintain an acceptable erosion and sediment control program (DPDR);**
- **Develop and implement a plan to reduce pollutants associated with road maintenance activities (with Highway Operations);**
- **Examine the use, control, and reduction of herbicides, pesticides, and fertilizers for all Frederick County government departments (coordination with many agencies);**

NPDES Compliance Activities: Public Outreach and Education

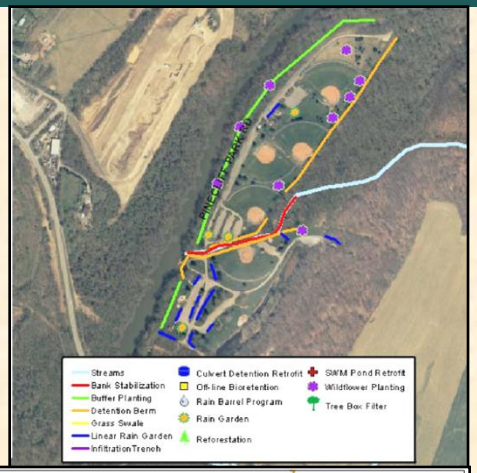
- NPDES Program offers significant public outreach
- Monocacy and Catoctin Watershed Alliance example
  - Non-advocacy working group facilitated by County's grant-funded Community Restoration Coordinator
  - Focus on outreach and vol. restoration to protect water quality and habitat
  - Partners include USGS, DNR Fisheries and Forest Service, MDE, Community Commons, Audubon Naturalist Society, Canaan Valley Institute, Potomac Conservancy, Catoctin Mountain Park, Hood College…

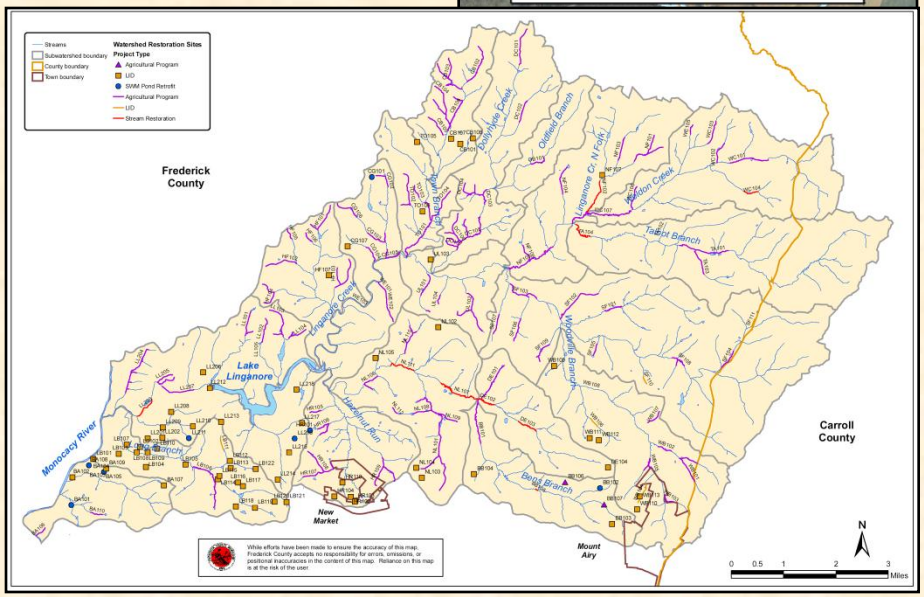
www.watershed-alliance.com

- Significant funding leverage; project coordination; volunteers; and other project resources.
- Great Frederick Fair booth
- Watershed Stewards program, road signs
- "Greener Lifestyles" publications
- Volunteer opportunities
- Workshops
- Web resources
- Landowner outreach

NPDES Compliance Activities: Watershed Restoration

- Completed Watershed Assessments for Ballenger, Lower Bush, Lower Linganore, Bennett Creeks, Upper Monocacy and Lower Monocacy River Watersheds (~60% of county).
- Conducted Restoration/Retrofit Reports for Ballenger, Lower Bush, Linganore, Bennett.
- Prioritized sites for community restoration, CIP.
- Linganore CIP example:
  - Selected Pinecliff Park stream restoration (in design)
  - Coordinated with Parks
  - Will protect park assets, water line, road culvert from erosion.

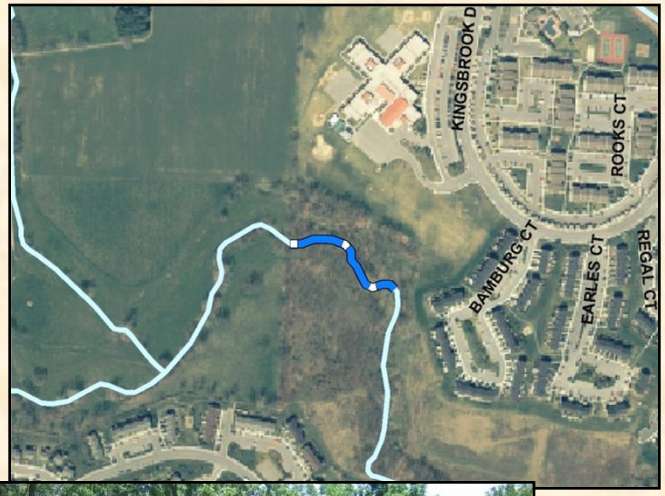




Candidate sites for restoration in the Linganore Watershed based on Restoration/Retrofit Assessment. Map and detail.

NPDES Compliance Activities: Watershed Restoration

- **Ballenger Creek Stream Restoration CIP example**



Map of project site, debris jam before, stabilization after

  - **Restored channel at Ballenger Creek Elementary School;**
  - **Multiple benefits provided through coordination with FCPS, DUSWM, Parks;**
    - **Stabilized banks, reduced sediment, removed debris jams;**
    - **Protected sewer line;**
    - **Created area for Ballenger Creek trail on bank and saved Parks $415K from having to install pedestrian bridge;**
    - **Improved habitat for fish, birds, other organisms;**
    - **Provided improved aesthetics to school; school thrilled with project.**

NPDES Compliance Activities: Watershed Restoration

- **Urbana High School Stormwater Retrofit CIP example**

Bioretention and pavers in courtyard

UHS bus lot before and after

  - **Partnered with FCPS**
  - **Existing stormwater pond treated volume but not quality;**
  - **Constructed bioretention facilities in courtyard and bus lot to treat quality;**
  - **Urbana High School students selected native plant list, will maintain garden;**
  - **Facilities look like landscaping feature;**
  - **Provided porous pavers at emergency exits; school extremely pleased with this feature, which adds safety and protects grass.**
  - **Water quality monitoring results will be used by school as teaching tool.**

NPDES Compliance Activities: Watershed Restoration

672-acre impervious area reduction goal for last permit cycle; expect MDE credit for restoration of 1302 acres:

- **68 ac. CIP projects (including OPM redevelopment projects);**
- **88 ac. Watershed Alliance partner projects;**
- **937 ac. Street sweeping (Highway Operations);**
- **209 ac. Community Restoration Projects:**

The High Cost of Restoration

	Impairment	Miles	Cost	Avg Cost/mile
Corsica River, MD	**Nutrients**	**7.6**	**$17,500,000**	**$2,300,000**
Little Laurel Run, PA	**Metals**	**3**	**$1,048,013**	**$349,338**
Conewago Ck, PA	**Nutrients**	**17**	**$4,300,000**	**$252,941**
Bear Ck, PA	**Metals**	**5**	**$964,000**	**$192,800**
Catawissa Ck, PA	**Metals**	**57.9**	**$3,500,000**	**$60,440**
Thumb Run, VA	**Bacteria**	**17**	**$2,450,000**	**$144,117**
Willis River, VA	**Bacteria**	**30**	**$2,794,160**	**$93,138**
Muddy Creek, VA	**Bacteria**	**9**	**$2,612,000**	**$290,222**

Where do we go from here?